

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1-13. (cancelled)

14. (withdrawn) A photoelectrode comprising a semiconductor layer having first and second opposite major surfaces, said first major surface overlaid with a layer of indium tin oxide (ITO) having a thickness of at least 4000 Angstroms.

15. (withdrawn) The photoelectrode of claim 14 wherein said semiconductor layer comprises photovoltaic, amorphous, silicon n-i-p material; and said indium tin oxide layer overlies p of said n-i-p.

16. (withdrawn) The photoelectrode of claim 14 wherein said semiconductor layer second major surface is in contact with an electrically conductive substrate.

17. (withdrawn) The photoelectrode of claim 16 wherein said photoelectrode comprises in order: said electrically conductive substrate comprising ss/Ag/ZnO, and said semiconductor comprising n-i-p; wherein said n-layer faces said ZnO, and said ITO layer overlies said p-layer.

18. (withdrawn) A photoelectrode comprising a semiconductor layer having a surface overlaid with an indium tin oxide (ITO) layer in the form of a highly oriented film.

19. (withdrawn) A photoelectrode comprising a semiconductor layer having a surface overlaid with an indium tin oxide (ITO) layer which comprises predominantly a cubic-phase oxide and a smaller amount by weight of a hexagonal-phase oxide.

20. (currently amended) A photoelectrochemical device for electrolysis of water to produce hydrogen comprising:

a container housing a photoelectrode, a counter electrode and an electrolyte solution, said photoelectrode and said counter electrode spaced apart from one another in said container and each being in contact with said electrolyte solution;

said photoelectrode comprising:

a semiconductor layer having a first major surface coated with a corrosion resistant an indium tin oxide (ITO) layer having a thickness of greater than 3000 Angstroms; and a second major surface in contact with an electrically conductive substrate;

said counter electrode comprising a metal;

said solution comprising a solvent which comprises water and a solute which comprises a base; and

an electrically conductive path external to the solution between said photoelectrode and said counter electrode.

21. (original) The device of claim 20 wherein said indium tin oxide layer is formed by generating a flux of material by bombarding a target comprising indium oxide and tin oxide and collecting said material on said first major surface of said semiconductor layer.

22. (original) The device of claim 20 wherein said photoelectrode comprises in order: said electrically conductive substrate comprising ss/Ag/ZnO, and said semiconductor comprising n-i-p; wherein said n-layer faces said ZnO, and said ITO layer overlies said p-layer.

23. (currently amended) A photoelectrochemical device for electrolysis of water to produce hydrogen comprising:

a container housing a photoelectrode, a counter electrode and an electrolyte solution, said photoelectrode and said counter electrode spaced apart from one another in said container and each being in contact with said electrolyte solution;

said photoelectrode comprising:

a semiconductor layer having a major surface coated with a corrosion resistant ~~an~~ indium tin oxide (ITO) layer in the form of a highly oriented film.

24. (original) The device of claim 23 wherein said ITO layer comprises predominantly a cubic-phase oxide and a smaller amount by weight of a hexagonal-phase oxide.

25. (previously presented) The device of claim 20 wherein said indium tin oxide (ITO) layer is formed by:

generating a flux of material by bombarding a target comprising indium oxide and tin oxide for a time of at least 30 minutes at a temperature of at least 200°C in a non-oxidizing atmosphere; and

collecting said material on said surface of said semiconductor layer to form said ITO layer thereon.

26. (previously presented) The device of claim 25 wherein said generating a flux of material by bombarding a target is conducted by sputter deposition.

27. (previously presented) The device of claim 25 wherein said non-oxidizing atmosphere is an inert atmosphere.

28. (previously presented) The device of claim 25 wherein said non-oxidizing atmosphere comprises argon.

29. (previously presented) The device of claim 25 wherein said non-oxidizing atmosphere is essentially oxygen-free.

30. (previously presented) The device of claim 25 wherein said temperature is at least 230°C.

31. (previously presented) The device of claim 25 wherein said time is at least 60 minutes.

32. (previously presented) The device of claim 25 wherein on the basis of 100 parts by weight, the indium oxide constitutes 90 parts and the tin oxide constitutes the balance.

33. (previously presented) The device of claim 25 wherein the ITO layer comprises predominately a cubic-phase oxide and a smaller amount by weight of a hexagonal-phase oxide.

34. (previously presented) The device of claim 25 wherein the ITO layer comprises a highly oriented film of highly oriented crystals.

35. (previously presented) The device of claim 25 wherein the indium oxide is represented by In_2O_3 and the tin oxide is represented by SnO_2 .

36. (previously presented) The device of claim 20 wherein said ITO layer is formed by bombarding a target, where on the basis of 100 parts by weight of the target, indium oxide constitutes 90 parts, in a non-oxidizing atmosphere for a time and at a temperature sufficient to deposit said layer of ITO.

37. (previously presented) The device of claim 36 wherein said thickness is greater than 4000 Angstroms and the target consists essentially of 90 parts indium oxide and ten parts tin oxide by weight.